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A Three-Decade Outburst of the LMC Luminous Blue Variable R 127 Draws to a Close

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Abstract. The paradigmatic Luminous Blue Variable R 127 in the Large Magellanic Cloud has been found in the intermediate, peculiar early-B state, and substantially fainter in visual light, signaling the final decline from its major outburst that began between 1978 and 1980. This transformation was detected in 2008 January, but archival data show that it began between early 2005 and early 2007. In fact, significant changes from the maximum, peculiar A-type spectrum, which was maintained from 1986 through 1998, had already begun the following year, coinciding with a steep drop in visual light. We show detailed correspondences between the spectrum and light, in which the decline mimics the rise. Moreover, these trends are not monotonic but are characterized by multiple spikes and dips, which may provide constraints on the unknown outburst mechanism. Intensive photometric and spectroscopic monitoring of R 127 should now resume, to follow the decline presumably back to the quiescent Ofpe/WN9 state, in order to fully document the remainder of this unique observational opportunity.

Keywords. stars: early-type, stars: individual (R 127, HDE 269858), stars: variables, Magellanic Clouds

References

Walborn, N.R., Stahl, O., Gamen, R.C., et al. 2008, *ApJ*, 683, L33

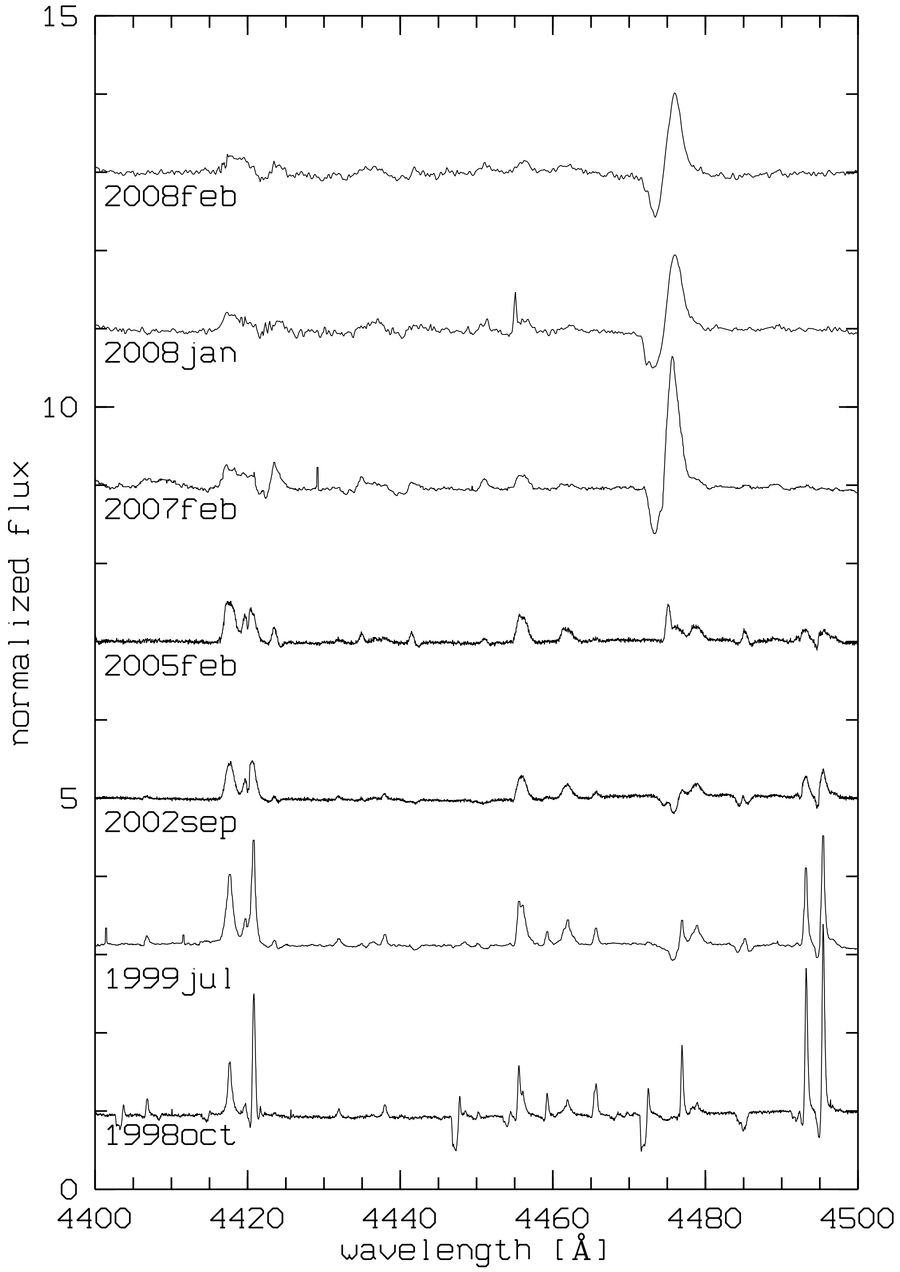

Figure 1. Time sequence of rectified spectroscopic observations of R 127. The wavelength scale is heliocentric, i.e., R 127's radial velocity of 293 km sec^{-1} or 4.4 Å at 4500 Å is included. The behavior of the 4414–17 Å complex with time is remarkable and is caused by the increasing contribution of [Fe II] relative to Fe II at nearly the same wavelengths; the former arises further out in the wind where the velocity is higher. Note also the transition from Fe II λ4473 to He I λ4471 from 1999 through 2005, and the double Mg II λ4481 absorption in 2002. The 2007–2008 spectra are dominated by the very strong He I λ4471 P Cyg profile. Plot by Otmar Stahl; see the reference for data sources and specifications.

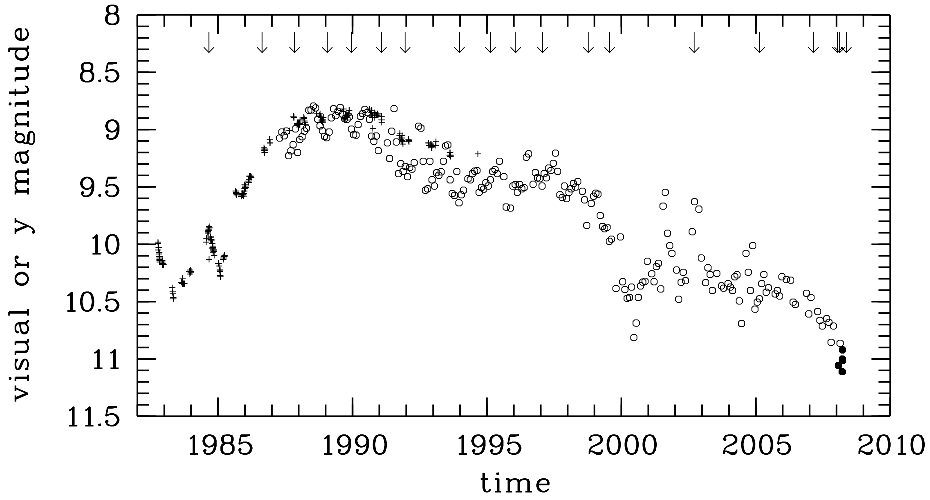

Figure 2. The composite visual light curve of R 127 from 1982 through early 2008. Crosses: y data from Sterken et al. Open circles: monthly averages of AAVSO visual observations. Filled squares: new Las Campanas V data. The epochs of the spectroscopic observations are marked by arrows at the top. Plot by Thomas Szeifert; see the reference for data sources and specifications.